

WHAT IS CLAIMED IS:

1. An image forming apparatus, comprising:

a first image carrying member configured to carry images in increasing order of corresponding sheet numbers;

a second image carrying member configured to carry an image transferred from said first image carrying member;

a plurality of ejection trays including a first ejection tray configured to stack a plurality of output sheets in a straight orientation and a second ejection tray configured to stack a plurality of output sheets in a reversed orientation; and

a sheet transferring mechanism configured to transfer a recording sheet to a nip formed between said first and second image carrying members,

wherein said first image carrying member is caused to transfer an image to one surface of said recording sheet and, at the same time, said second image carrying member is caused to transfer another image to another surface of said recording sheet in response to a selection between said first and second ejection trays in a double-side recording mode so that said first and second ejection trays stack said plurality of recording sheets in increasing order of pages.

2. An image forming apparatus as defined in Claim 1, further comprising a mode selecting mechanism configured to select one of a single-side recording mode and said double-side recording mode.

3. An image forming apparatus as defined in Claim 1, further comprising a tray selecting mechanism configured to select one of said first and second ejection

trays.

4. An image forming apparatus as defined in Claim 1, further comprising a sheet selecting mechanism configured to select a type of sheet, and wherein one of said first and second ejection trays is selected in accordance with a selection made by said sheet selecting mechanism.

5. An image forming apparatus as defined in Claim 1, further comprising a plurality of sheet supplying mechanism each configured to supply the recording sheets to said sheet transferring mechanism.

6. An image forming apparatus as defined in Claim 5, further comprising a cassette selecting mechanism configured to select one of said plurality of sheet supplying mechanism.

7. An image forming apparatus as defined in Claim 5, further comprising a sheet selecting mechanism configured to select a type of sheet, and wherein one of said plurality of sheet supplying mechanism is selected in accordance with a selection made by said sheet selecting mechanism.

8. An image forming apparatus as defined in Claim 1, further comprising an extra sheet supplying mechanism configured to insert a recording sheet in an approximately straight orientation, and wherein a recording sheet is transferred from said extra sheet supplying mechanism to said first ejection tray via said sheet

transferring mechanism.

9. An image forming apparatus as defined in Claim 8, further comprising a sheet selecting mechanism configured to select a type of sheet, and wherein said extra sheet supplying mechanism and said first ejection tray are selected when said sheet selecting mechanism selects a thick sheet.

10. An image forming apparatus as defined in Claim 8, wherein said extra sheet supplying mechanism includes a manual sheet insertion tray.

11. An image forming apparatus as defined in Claim 10, further comprising a sensor for detecting an event in that said manual sheet insertion tray is accessed by a user, and wherein said extra sheet supplying mechanism and said first ejection tray are selected when said sensor detects said event.

12. An image forming apparatus as defined in Claim 1, wherein said first image carrying member is caused to transfer an image of odd page to an upper surface of said recording sheet and, at the same time, said second ejection tray is caused to transfer an image of even page on a lower surface of said recording sheet when said second ejection tray is selected in a double-side recording mode so that said second ejection tray stacks a plurality of said recording sheets in increasing order of pages.

13. An image forming apparatus as defined in Claim 3, wherein said first image carrying member is caused to transfer an image to on one surface of said

recording sheet and said second image carrying member is caused to transfer another image on another surface of said recording sheet in response to a selection made by said tray selecting mechanism between said first and second ejection trays.

14. An image forming apparatus as defined in Claim 2, wherein said mode selecting mechanism is mounted on a control panel of said apparatus.

15. An image forming apparatus as defined in Claim 3, wherein said tray selecting mechanism is mounted on a control panel of said apparatus.

16. An image forming apparatus as defined in Claim 4, wherein said sheet selecting mechanism is mounted on a control panel of said apparatus.

17. An image forming apparatus as defined in Claim 6, wherein said cassette selecting mechanism is mounted on a control panel of said apparatus.

18. An image forming apparatus as defined in Claim 1, wherein selections of a single-side recording mode and said double-side recording mode, said first and second ejection trays, and a type of sheet are made from an external host system.

19. An image forming apparatus as defined in Claim 5, wherein a selection of said plurality of sheet supplying mechanisms is made from an external host system.

20. An image forming apparatus as defined in Claim 1, wherein said first image carrying member has a property of photoconductivity and carries a toner image made in accordance with an electrophotographic method and said second image carrying member carries a toner image transferred from said first image carrying member.

21. An image forming apparatus, comprising:

- an image reading mechanism configured to read an original;
- an image forming mechanism configured to perform an image recording operation including image forming, image carrying, and image transferring processes;
- a plurality of ejection trays;
- a plurality of sheet cassettes; and
- a sheet transferring mechanism configured to transfer a recording sheet from one of said plurality of sheet cassettes to a nip formed between said first and second image carrying members,

wherein said image forming mechanism performs said image recording operation in response to a selection between said plurality of ejection trays in accordance with images from originals read by said image reading mechanism either in a single-side or double-side recording mode so that said plurality of ejection trays stack a stack of recording sheets in increasing order of pages.

22. An image forming apparatus as defined in Claim 21, wherein said image forming mechanism forms a toner image in accordance with an electrophotographic method and comprises:

- a first image carrying member configured to form a toner image and to carry it

thereon in increasing order of pages starting from a first page; and

a second image carrying member configured to carry the toner image transferred from said first image carrying member,

said first image carrying member transferring the toner image to one side of a recording sheet and said second image carrying member transferring the toner image to the other side of the recording sheet.

23. An image forming apparatus as defined in Claim 21, wherein said plurality of ejection trays includes a first ejection tray configured to stack a plurality of output sheets in a straight orientation and a second ejection tray configured to stack a plurality of output sheets in a reversed orientation.

24. An image forming apparatus as defined in Claim 21, wherein said stack of recording sheets stacked in increasing order of pages is a stack of recording sheets recorded in said single-side recording mode.

25. An image forming apparatus as defined in Claim 21, wherein said stack of recording sheets stacked in increasing order of pages is a stack of recording sheets recorded in said double-side recording mode.

26. An image forming apparatus as defined in Claim 21, wherein said image reading mechanism reads an image on a side of a single-sided original in a single-side reading mode and images on both sides of a double-sided original in a double-side reading mode.

27. An image forming apparatus as defined in Claim 26, wherein said image forming mechanism records images in said single-side recording mode and outputs in increasing order of pages when said images are read in said double-side reading mode by said reading mechanism.

28. An image forming apparatus as defined in Claim 26, wherein said image forming mechanism records images in said double-side recording mode and outputs in increasing order of pages when said images are read in said double-side reading mode by said reading mechanism.

29. An image forming apparatus as defined in Claim 26, wherein said image reading mechanism reads images on both sides of a double-sided original through one time sheet transferring process by moving said double-side original.

30. An image forming apparatus as defined in Claim 29, wherein said image reading mechanism comprises:

a first image reading unit configured to read an image of an original by moving the original; and

a second image reading unit configured to read an image of an original by holding the original at a predetermined position.

31. An image forming apparatus as defined in Claim 30, wherein said second image reading unit includes a moving member that moves under a contact glass and is used as a part of said first image reading unit under a condition in that said

moving member is stopped.

32. An image forming apparatus as defined in Claim 30, wherein said second image reading unit is usable when originals are placed on a sheet tray of said first image reading unit.

33. An image forming apparatus as defined in Claim 26, wherein said image reading mechanism includes a sheet reversing mechanism and reads images on both sides of an original.

34. An image forming apparatus as defined in Claim 21, wherein said image reading mechanism includes a detector for detecting an event that an image on reading is of white and cancels reading the image when the image is detected as a page of white.

35. An image forming apparatus as defined in Claim 21, wherein one of said plurality of ejection trays is formed in a space between said image reading mechanism and said image forming mechanism.

36. An image forming apparatus as defined in Claim 21, wherein said image reading mechanism includes a tray for ejecting originals, said tray having a size within a projection area of said apparatus.

37. An image forming apparatus as defined in Claim 21, wherein a

recording sheet is transferred in an approximately straight line from one of said plurality of sheet cassettes to one of said plurality of ejection trays.

38. An image forming apparatus as defined in Claim 37, wherein said one of said plurality of sheet cassettes is a manual sheet inserting tray.

39. An image forming apparatus as defined in Claim 21, further comprising a control panel close to said image reading mechanism, said control panel comprising:

a selecting mechanism configured to select one of said single-side recording and said double-side recording; and

a selecting mechanism configured to select one of said plurality of ejection trays.

40. An image forming apparatus as defined in Claim 21, wherein said image forming mechanism forms images in increasing order of corresponding sheet numbers.

41. An image forming apparatus as defined in Claim 21, wherein said image forming mechanism forms a plurality of images in increasing order of pages when said image reading mechanism reads said plurality of images in increasing order of pages.

42. An image forming apparatus as defined in Claim 21, wherein said first

image carrying member has a property of photoconductivity and said second image carrying member is a belt-shaped intermediate transfer member having a surface resistance in a range of from 10^5 to 10^{12} .

43. An image forming apparatus as defined in Claim 42, further comprising a fixing mechanism configured to fix images attached on both sides of a recording sheet while said recording sheet is supported by said belt-shaped intermediate transfer member.

44. An image forming apparatus as defined in Claim 42, wherein said belt-shaped intermediate transfer member is of heat resistance.

45. An image forming apparatus as defined in Claim 21, wherein said image forming mechanism performs said image recording operation in accordance with image information sent from an external host system, one of said single-side recording mode and said double-side recording mode is selected by said external host system, and one of said plurality of ejection trays is selected by said external host system.

46. An image forming apparatus as defined in Claim 21, further comprising an external ejection tray unit that includes a connecting sheet path connected to a sheet path of said apparatus for turning and ejecting a recording sheet sent from said image forming mechanism into one of said plurality of ejection trays, wherein said external ejection tray unit stacks a plurality of recording sheet in increasing order of pages.

47. An image forming apparatus as defined in Claim 46, wherein said connecting sheet path is arranged along an edge portion of said one of said plurality of ejection trays.

48. An image forming apparatus as defined in Claim 47, further comprising a switching pawl configured to selectively switch between ways for a recording sheet to said one of said plurality of ejection trays and said external ejection tray unit.

49. An image forming apparatus as defined in Claim 21, further comprising another external ejection tray unit that includes a connecting sheet path connected to a sheet path of said apparatus for ejecting a recording sheet sent from said image forming mechanism in an approximately straight manner into one of said plurality of ejection trays, wherein said external ejection tray unit stacks a plurality of recording sheet in increasing order of pages.

50. An image forming apparatus, comprising:
first image carrying means for carrying images in increasing order of corresponding sheet numbers;
second image carrying means for carrying an image transferred from said first image carrying means;
a plurality of ejection tray means including first ejection tray means for stacking a plurality of output sheets in a straight orientation and second ejection tray means for stacking a plurality of output sheets in a reversed orientation; and

sheet transferring means for transferring a recording sheet to a nip formed between said first and second image carrying means,

wherein said first image carrying means is caused to transfer an image to one surface of said recording sheet and, at the same time, said second image carrying means is caused to transfer another image to another surface of said recording sheet in response to a selection between said first and second ejection tray means in a double-side recording mode so that said first and second ejection tray means stack said plurality of recording sheets in increasing order of pages.

51. An image forming apparatus as defined in Claim 50, further comprising mode selecting means for selecting one of a single-side recording mode and said double-side recording mode.

52. An image forming apparatus as defined in Claim 50, further comprising tray selecting means for selecting one of said first and second ejection tray means.

53. An image forming apparatus as defined in Claim 50, further comprising sheet selecting means selecting a type of sheet, and wherein one of said first and second ejection tray means is selected in accordance with a selection made by said sheet selecting means.

54. An image forming apparatus as defined in Claim 50, further comprising a plurality of sheet supplying means each for supplying the recording sheets

to said sheet transferring means.

55. An image forming apparatus as defined in Claim 54, further comprising cassette selecting means for selecting one of said plurality of sheet supplying means.

56. An image forming apparatus as defined in Claim 54, further comprising sheet selecting means for selecting a type of sheet, and wherein one of said plurality of sheet supplying means is selected in accordance with a selection made by said sheet selecting means.

57. An image forming apparatus as defined in Claim 50, further comprising extra sheet supplying means inserting a recording sheet in an approximately straight orientation, and wherein a recording sheet is transferred from said extra sheet supplying means to said first ejection tray means via said sheet transferring means.

58. An image forming apparatus as defined in Claim 57, further comprising sheet selecting means selecting a type of sheet, and wherein said extra sheet supplying means and said first ejection tray means are selected when said sheet selecting means selects a thick sheet.

59. An image forming apparatus as defined in Claim 57, wherein said extra sheet supplying means includes manual sheet insertion tray means.

60. An image forming apparatus as defined in Claim 59, further comprising sensing means for detecting an event in that said manual sheet insertion tray means is accessed by a user, and wherein said extra sheet supplying means and said first ejection tray means are selected when said sensing means detects said event.

61. An image forming apparatus as defined in Claim 50, wherein said first image carrying means is caused to transfer an image of odd page to an upper surface of said recording sheet and, at the same time, said second ejection tray means is caused to transfer an image of even page on a lower surface of said recording sheet when said second ejection tray means is selected in a double-side recording mode so that said second ejection tray means stacks a plurality of said recording sheets in increasing order of pages.

62. An image forming apparatus as defined in Claim 52, wherein said first image carrying means is caused to transfer an image to on one surface of said recording sheet and said second image carrying means is caused to transfer another image on another surface of said recording sheet in response to a selection made by said tray selecting means between said first and second ejection tray means.

63. An image forming apparatus as defined in Claim 51, wherein said mode selecting means is mounted on a control panel of said apparatus.

64. An image forming apparatus as defined in Claim 52, wherein said tray selecting means is mounted on a control panel of said apparatus.

65. An image forming apparatus as defined in Claim 53, wherein said sheet selecting means is mounted on a control panel of said apparatus.

66. An image forming apparatus as defined in Claim 55, wherein said cassette selecting means is mounted on a control panel of said apparatus.

67. An image forming apparatus as defined in Claim 50, wherein selections of a single-side recording mode and said double-side recording mode, said first and second ejection tray means, and a type of sheet are made from an external host system.

68. An image forming apparatus as defined in Claim 54, wherein a selection of said plurality of sheet supplying means is made from an external host system.

69. An image forming apparatus as defined in Claim 50, wherein said first image carrying means has a property of photoconductivity and carries a toner image made in accordance with an electrophotographic method and said second image carrying means carries a toner image transferred from said first image carrying means.

70. An image forming apparatus, comprising:
image reading means for reading an original;
image forming means for performing an image recording operation including image forming, image carrying, and image transferring processes;

a plurality of ejection tray means;
a plurality of sheet cassette means; and
sheet transferring means for transferring a recording sheet from one of said plurality of sheet cassette means to a nip formed between said first and second image carrying means,

wherein said image forming means performs said image recording operation in response to a selection between said plurality of ejection tray means in accordance with images from originals read by said image reading means either in a single-side or double-side recording mode so that said plurality of ejection tray means stack a stack of recording sheets in increasing order of pages.

71. An image forming apparatus as defined in Claim 70, wherein said image forming means forms a toner image in accordance with an electrophotographic method and comprises:

first image carrying means for forming a toner image and to carry it thereon in increasing order of pages starting from a first page; and

second image carrying means carrying the toner image transferred from said first image carrying means,

said first image carrying means transferring the toner image to one side of a recording sheet and said second image carrying means transferring the toner image to the other side of the recording sheet.

72. An image forming apparatus as defined in Claim 70, wherein said plurality of ejection tray means includes first ejection tray means for stacking a plurality

of output sheets in a straight orientation and a second ejection tray means for stacking a plurality of output sheets in a reversed orientation.

73. An image forming apparatus as defined in Claim 70, wherein said stack of recording sheets stacked in increasing order of pages is a stack of recording sheets recorded in said single-side recording mode.

74. An image forming apparatus as defined in Claim 70, wherein said stack of recording sheets stacked in increasing order of pages is a stack of recording sheets recorded in said double-side recording mode.

75. An image forming apparatus as defined in Claim 70, wherein said image reading means reads an image on a side of a single-sided original in a single-side reading mode and images on both sides of a double-sided original in a double-side reading mode.

76. An image forming apparatus as defined in Claim 75, wherein said image forming means records images in said single-side recording mode in increasing order of pages when said images are read in said double-side reading mode by said reading means.

77. An image forming apparatus as defined in Claim 75, wherein said image forming means records images in said double-side recording mode and outputs in increasing order of pages when said images are read in said double-side reading mode

by said reading means.

78. An image forming apparatus as defined in Claim 75, wherein said image reading means reads images on both sides of a double-sided original through one time sheet transferring process by moving said double-side original.

79. An image forming apparatus as defined in Claim 78, wherein said image reading means comprises:

first image reading means for reading an image of an original by moving the original; and

second image reading means for reading an image of an original by holding the original at a predetermined position.

80. An image forming apparatus as defined in Claim 79, wherein said second image reading means includes moving means for moving under a contact glass and is used as a part of said first image reading means under a condition in that said moving means is stopped.

81. An image forming apparatus as defined in Claim 79, wherein said second image reading means is usable when originals are placed on a sheet tray of said first image reading means.

82. An image forming apparatus as defined in Claim 75, wherein said image reading means includes sheet reversing means for reversing an original and reads

images on both sides of said original.

83. An image forming apparatus as defined in Claim 70, wherein said image reading means includes detecting means for detecting an event that an image on reading is of white and cancels reading of the image when the image is detected as a page of white.

84. An image forming apparatus as defined in Claim 70, wherein one of said plurality of ejection tray means is formed in a space between said image reading means and said image forming means.

85. An image forming apparatus as defined in Claim 70, wherein said image reading means includes tray means for ejecting originals, said tray means having a size within a projection area of said apparatus.

86. An image forming apparatus as defined in Claim 70, wherein a recording sheet is transferred in an approximately straight line from one of said plurality of sheet cassette means to one of said plurality of ejection tray means.

87. An image forming apparatus as defined in Claim 86, wherein said one of said plurality of sheet cassette means is manual sheet inserting tray means.

88. An image forming apparatus as defined in Claim 70, further comprising control panel means close to said image reading means, said control panel

means comprising:

selecting means for selecting one of said single-side recording and said double-side recording; and

selecting means for selecting one of said plurality of ejection tray means.

89. An image forming apparatus as defined in Claim 70, wherein said image forming means forms images in increasing order of corresponding sheet numbers.

90. An image forming apparatus as defined in Claim 70, wherein said image forming means forms a plurality of images in increasing order of pages when said image reading means reads said plurality of images in increasing order of pages.

91. An image forming apparatus as defined in Claim 70, wherein said first image carrying means has a property of photoconductivity and said second image carrying means is belt-shaped intermediate transfer means having a surface resistance in a range of from 10^5 to 10^{12} .

92. An image forming apparatus as defined in Claim 91, further comprising fixing means for fixing images attached on both sides of a recording sheet while said recording sheet is supported by said belt-shaped intermediate transfer means.

93. An image forming apparatus as defined in Claim 91, wherein said belt-shaped intermediate transfer means is of heat resistance.

94. An image forming apparatus as defined in Claim 70, wherein said image forming means performs said image recording operation in accordance with image information sent from an external host system, one of said single-side recording mode and said double-side recording mode is selected by said external host system, and one of said plurality of ejection tray means is selected by said external host system.

95. An image forming apparatus as defined in Claim 70, further comprising external ejection tray means for stacking a plurality of recording sheet in increasing order of pages, wherein said external ejection tray means includes a connecting sheet path connected to a sheet path of said apparatus for turning and ejecting a recording sheet sent from said image forming means into one of said plurality of ejection tray means.

96. An image forming apparatus as defined in Claim 95, wherein said connecting sheet path is arranged along an edge portion of said one of said plurality of ejection tray means.

97. An image forming apparatus as defined in Claim 96, further comprising switching pawl means for selectively switching between ways for a recording sheet to said one of said plurality of ejection tray means and said external ejection tray means.

98. An image forming apparatus as defined in Claim 70, further comprising another external ejection tray means for stacking a plurality of recording

sheet in increasing order of pages, wherein said another external ejection tray means includes a connecting sheet path connected to a sheet path of said apparatus for ejecting a recording sheet sent from said image forming means in an approximately straight manner into one of said plurality of ejection tray means.

99. A method for image forming, comprising the steps of:

selecting one of a single-side recording and a double-side recording;

choosing one of a face-down stack and a face-up stack;

inputting a plurality of images in increasing order of pages;

performing a double-side recording operation when said double-side recording is selected, said performing step comprising the steps of:

forming two successive images in increasing order of corresponding sheet numbers;

transferring said two successive images onto both surfaces of a recording sheet;

fixing said two successive images attached on said both surfaces of said recording sheet; and

stacking said recording sheet in an orientation in accordance with a choice chosen by said choosing step;

repeating said performing step until said images input by said inputting step are recorded;

executing a single-side recording operation when said single-side recording is selected, said executing step comprising the steps of:

forming an images in increasing order of corresponding sheet

numbers;

transferring said image onto one surface of a recording sheet;

fixing said image attached on said on surface of said recording sheet;

and

stacking said recording sheet in an orientation in accordance with a choice chosen by said choosing step; and

repeating said executing step until said images input by said inputting step are recorded.

100. A method as defined in Claim 99, wherein said inputting step reads a plurality of originals and generates data of a plurality of images.